and the cubital and radial joints are clavate, the former having a conical, pointed process projecting at right angles from its extremity, on the under side, and the latter a very minute, bifid, black apophysis at its extremity, in front; the digital joint is small, oval, convex and hairy externally, concave within, comprising the palpal organs, which are moderately developed, not very complicated in structure, and of a pale red-brown colour. The cephalo-thorax is oval, convex, glossy, with slight furrows on the sides converging towards an indentation in the medial line; the falces are powerful, subconical, vertical, convex at the base, in front, divergent at the extremity, armed with teeth on the inner surface, and have a conical tooth-like process near the middle, towards the inner side, and numerous minute, pointed prominences in front; the maxillæ are convex at the base, enlarged where the palpi are inserted, and at the extremity, which has a pointed process on the outer side, and incline towards the lip, which is semicircular and prominent at the apex; and the sternum is broad, glossy, and heart-shaped. These parts have a reddish-brown colour, the lip and anterior part of the cephalo-thorax being much the darkest. The four intermediate eyes form a trapezoid, the two anterior ones, which constitute its shortest side, being the smallest and darkest of the eight; and those of each lateral pair are seated obliquely on a small tubercle, and are almost in contact. The abdomen is oviform, thinly clothed with hairs, convex above, projecting over the base of the cephalo-thorax; it has a dark olive hue, the under part being the palest, and the colour of the branchial opercula is yellow; along the middle of the upper part there extends a series of obscure, curved, grayish lines whose convexity is directed forwards; and two indentations occur on each side of the medial line, the posterior pair being rather the wider apart.

Two adult males of this species were received from Mr. R. H. Meade in June 1855, one of which had been taken in the vicinity of Burton-on-Trent, and the other at Hornsea, near the east coast of Yorkshire, in the preceding year.

XII.—*Note on the Descent of Glaciers.*

By J. Gwyn Jeffreys, Esq., F.R.S.

The different theories, propounded from time to time by so many able observers of this singular phænomenon, have been so earnestly and plausibly argued, that it may be worth while to inquire if they cannot be reconciled with each other; and, although my knowledge of the subject does not enable me to do so, I trust I shall not be considered presumptuous in offering a sug-

gestion which may be improved by some abler pen. My attention has been somewhat directed to the question in consequence of my having resided during a considerable part of last year in Switzerland, the land of glaciers, where I had the good fortune of making the acquaintance of that veteran geologist, M. de Charpentier.

These theories appear to be five in number.

1st. That of De Saussure, who supposed that glaciers descended solely by their own weight; and this has been called the "Gravitation" theory. His observations have justly had the credit of being most accurate; and they extended over a great number of years, and were conducted with much labour and at considerable expense. They will be found in his 'Voyage dans les Alpes,' published in 1779.

2nd. That of De Charpentier, and adopted by Agassiz, which supposed that the phænomenon was caused by the surface of the glacier being thawed during the day; that the water thus produced percolated the porous material; and that upon congelation taking place at night the whole structure expanded in every direction, naturally occasioning or accelerating a downward movement in the direction of the slope. This is called the "Dilatation" theory. It was first propounded by Charpentier at a Meeting of the Helvetic Society held at Lucerne in 1834; and it appeared in the 8th volume of the 'Annales des Mines.' It was afterwards (in 1841) published by him in a more elaborate form under the title of 'Essai sur les Glaciers.' Agassiz' memoir was read at a Meeting of the same Society held at Neuchatel in 1837; and it was, I believe, published in their Transactions. In his work entitled 'Etudes sur les Glaciers,' and published in 1840, this theory is further developed.

3rd. That of Professor James Forbes, which attributed the phænomenon to the viscous or plastic nature of the glacier, causing the descent *suis viribus*. This has been called in Germany the "Pech" theory, and was published in 1843 by our distinguished countryman in his work on Glaciers.

4th. That of Mr. Hopkins of Cambridge (mentioned by Professor Forbes), who referred the motion of a glacier to the dissolution of the ice in contact with the rock; although Charpentier had previously instanced some striking facts to prove that the glacier bed never thaws.

And 5th. The theory lately offered by the Rev. Henry Moseley and published in the 7th volume of the Royal Society's Proceedings, which (assimilating a glacier to a sheet of lead) supposed that the phænomenon was owing to the heat of the sun, and consequently to an alternate expansion and contraction of the material.

Now the suggestion I would venture to make is, that the phænomenon may be attributed to all and each of the forces above mentioned; and that the discrepancy of opinion between so many experienced and trustworthy observers may arise from their researches having been conducted at different seasons of the year, in different states of temperature, on different soils or kinds of rock (some of which retain or impart more heat than others), at different heights above the sea-level, after the fall of a greater or less quantity of glacier snow, at different degrees of solar heat or radiation, or under many other different conditions. Some of the theories are self-evident, and have been admitted to a certain extent by their opponents. Perhaps the structure of the material in various climates and at different heights may be better known when the science of photography has been further applied to it, as I cannot help thinking that the interesting and kaleidoscopic forms of snow (taken by Mrs. Glaisher), which were exhibited at the last *soirée* given by the Assistant Secretary of the Royal Society, may throw some light on this vexed and difficult question.

It seems to me that the *modi operandi* of nature for the same purpose are various, and that the inanimate and animated creation are governed by similar or analogous laws. An illustration of this occurs to me in the case of certain marine mollusks and annelids which perforate limestone and other rocks. This operation has been attributed by naturalists to many and different causes: viz. to mechanical action, to a solvent power, to continual maceration of the material, as well as to the action of siliceous bodies which are occasionally found in some of these mollusks. The modern and better opinion, however, seems to be, that all or more than one of these various methods are used by the same species, and perhaps by the same animal, in effecting its object, according to the nature of the material acted on, the age of the individual, and other circumstances.

London, 13th July 1855.

BIBLIOGRAPHICAL NOTICES.

Catalogue of British Hymenoptera in the Collection of the British Museum. Part I. *Apidæ*—Bees. By Frederick Smith, M.E.S. London: Printed by Order of the Trustees, 1855. 12mo.

Amongst the many anomalies presented by the state of Entomology in this country, the little attention paid to the interesting family of the Bees is certainly none of the least. It is indeed singular that the majority of our entomologists should confine themselves so religiously to the study of Coleoptera and Lepidoptera, the habits of which are